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| 09/783,711      | 02/14/2001  | David Michael Stuttard | .9404.17372         | 2194             |

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EXAMINER

FUREMAN, JARED

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
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2876

DATE MAILED: 04/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/783,711

Applicant(s)

STUTTARD, DAVID MICHAEL

Examiner

Jared J. Fureman

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 and 20-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-14, 18 and 20-29 is/are allowed.
- 6) ☒ Claim(s) 15-17 and 30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 12.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

### **DETAILED ACTION**

Receipt is acknowledged of the amendment, substitute specification, and IDS, filed on 11/21/2002, which have been entered in the file. Claims 1-18 and 20-30 are pending.

#### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

#### ***Claim Objections***

2. Claims 23, 24, and 28 are objected to because of the following informalities:

Claim 23, line 10: "the optical pathway" lacks proper antecedent basis.

Claim 24, line 2: "the" (third occurrence) should be replaced with --an--, in order to avoid a lack of proper antecedent basis for "the internal surface".

Claim 28, line 2: ":", should be replaced with --;--.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 15 is rejected under 35 U.S.C. 102(b) as being anticipated by Smith (US 4,445,359).

Smith teaches a gas sensor comprising: an optical source (12) for emitting radiation therefrom, a detector (18) sensitive to radiation emitted from the source, a chamber (19), extending between the source and the detector, defined by a plurality of non-focusing, planar surfaces disposed to form a folded optical pathway that includes a plurality of segments (20 and 24) substantially parallel to one another, each segment having at least one planar mirror surface (26 and 28, respectively) adapted to reflect radiation to an adjacent segment at an approximately right angle (see figure 1 and column 2 lines 7-48).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over <sup>Wong</sup> (US 5,060,508, previously cited) in view of Smith.

Wong teaches a gas sensor comprising: an optical source (12) for emitting radiation therefrom, a detector (26) sensitive to radiation emitted from the source, a chamber (20) extending between the source and the detector defined by a plurality of non-focusing planar surfaces (the side walls of the passage 20 are planar surfaces) disposed to form a folded optical pathway that includes a plurality of segments substantially parallel to one another (as can be seen in figures 1, 2, and 4, the passage

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20 includes a plurality of segments substantially parallel to one another) (see figures 1, 2, 4, column 3 lines 10-18, 27-45, column 3 line 59 - column 4 line 26), a chamber cover (second half 52) forming a top closure for the chamber, including a reflective inner surface (the groove 60 in the second half is coated with a thin metallic layer to provide reflectivity, see column 4, lines 20-26) in combination with a gas permeable member (the second half, as well as the first half, includes passages extending from the passage 20 to the outside of the sensor, thus making the second halves gas permeable, see column 3 lines 40-45).

Wong fails to specifically teach each segment having at least one planar mirror surface adapted to reflect radiation to an adjacent segment at an approximately right angle.

The teachings of Smith have been discussed above.

In view of Smith's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the gas sensor as taught by Wong, each segment having at least one planar mirror surface adapted to reflect radiation to an adjacent segment at an approximately right angle, since the planar mirrors as taught by Smith will provide a better reflection of light to adjacent segments than the curved reflective surfaces as taught by Wong.

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wong as modified by Smith further in view of Sun et al (US 6,469,303 B1).

The teachings of Wong as modified by Smith have been discussed above.

Wong as modified by Smith fails to teach the gas permeable member comprising a flame arresting material.

Sun et al teaches a gas sensor (100) including a gas permeable member (120) comprising a flame arresting material (sintered metal) (see figure 1 and column 5 lines 55-67).

In view of Sun et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the sensor as taught by Wong as modified by Smith, the gas permeable member comprising a flame arresting material, in order to provide a gas sensor having explosion-proof capability, which may be used in flammable/explosive environments.

8. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ito (US 4,700,079, previously cited) in view of Wong and Sun et al.

Ito teaches a gas sensor comprising: an optical source (1) for emitting radiation therefrom, a detector (5) sensitive to radiation emitted from the source, a circumferential chamber (4) having optically reflective surfaces (the block 3 and groove 4 is coated with a bright metal film 15) extending between the source and the detector, the chamber is defined by outer and inner circumferential walls of a substantially cylindrical housing (3) (see figures 1, 2, column 2 line 25 - column 3 line 11).

Ito fails to teach a chamber cover forming a closure for the cylindrical housing, the chamber cover including a reflective inner surface in combination with a gas permeable member.

Wong teaches a gas sensor including a cover (52) forming a closure, the chamber cover including a reflective inner surface (the groove 60 of the second half 52 is coated with a thin metallic layer) in combination with a gas permeable member (the second half 52 includes passages), the gas permeable member covering an annular portion of the circumferential chamber (the second half covers the curved portions of the grooves 58 and 60, see figures 1, 2, 4, column 3 lines 10-18, 27-45, column 3 line 59 - column 4 line 26).

In view of Wong's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the gas sensor as taught by Ito, a chamber cover forming a closure for the cylindrical housing, the chamber cover including a reflective inner surface in combination with a gas permeable member, the gas permeable member covering an annular portion of the circumferential chamber, in order to provide a semi-enclosed chamber thereby preventing dispersion of the light emitted by the optical source.

Ito as modified by Wong fails to teach the gas permeable member comprising a flame arresting material.

The teachings of Sun et al have been discussed above.

In view of Sun et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the sensor as taught by Ito as modified by Wong, the gas permeable member comprising a flame arresting material, in order to provide a gas sensor having explosion-proof capability, which may be used in flammable/explosive environments.

***Allowable Subject Matter***

9. Claims 1-14, 18, and 20-29 have been allowed over the prior art of record.

10. The following is a statement of reasons for allowance: The prior art of record, taken alone or in combination, fails to teach or fairly suggest: a gas sensor including a chamber having optically reflective surfaces defining a substantially circular portion of the optical pathway and a substantially radial portion of the optical pathway and at least one reflector oriented generally at an oblique angle to the substantially circular portion of the optical pathway to separate the substantially circular portion of the optical pathway and the substantially radial portion of the optical pathway; and a gas sensor wherein the gas permeable member comprises a disc having a radius greater than a radius of the inner circumferential wall and less than a radius of the outer circumferential wall, in combination with the other claimed elements as set forth in the claims.

Ito teaches the source (1) and the detector (5) being located at the beginning and end, respectively, of the chamber (4), and does not require a second end wall to reflect light to the detector. Thus, there is no motivation (other than applicants) to modify the sensor as taught by Ito to include a reflector oriented generally at an oblique angle to the substantially circular portion to separate the substantially circular portion of the optical pathway and the substantially radial portion of the optical pathway, as set forth in the claims.

The cover/gas permeable member (second halve 52) as taught by Wong has the same dimensions as the base (first halve 50), thus, there is no motivation (other than applicants) to provide a gas permeable member comprising a disc having a radius



greater than a radius of the inner circumferential wall and less than a radius of the outer circumferential wall, as set forth in the claims.

### ***Response to Arguments***

11. Applicant's arguments with respect to claims 15-17 and 30 have been considered but are moot in view of the new ground(s) of rejection.

As discussed above, Smith teaches planar mirror surfaces adapted to reflect radiation to an adjacent segment at an approximately right angle, and Sun et al teaches a gas permeable member comprising a flame arresting material.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kadwell et al (US 6,326,897 B2) and Wallin (US 5,517,314) both teach sensors having a planar mirror surfaces adapted to reflect radiation to an adjacent segment at an approximately right angle. Vaughn et al (US 5,225,786) teaches a sensor having a gas permeable member comprising a flame arresting material. Hunter (GB 2 261 502 A) teaches a sensor having reflectors to create a folded optical path.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared J. Fureman whose telephone number is (703) 305-0424. The examiner can normally be reached on 7:00 am - 4:30 PM M-T, and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Lee can be reached on (703) 305-3503. The fax phone numbers

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for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

*Jared J. Fureman*  
Jared J. Fureman  
March 27, 2003